

# Abstract

Astrophysics and Geophysics

SYMMETRY ANALYSIS AND THE LANE-EMDEN EQUATION, W. A. Brege<sup>1</sup>,  
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We will employ symmetry analysis to the Lane-Emden equation (LE). LE has been used for over a century to model the density distribution within the interior of stellar structures. Since LE is a non-linear second order ordinary differential equation, numerical analysis has been required when reduction to quadrature is not possible. In this talk, we will use Lie theory to determine when it LE is reducible to quadrature (i.e., under specific spatial dimensions). The Lie algebras of LE will be presented for each dimension, as well as an exemplary application to quadrature reduction.

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